

## A PROPOSAL FOR A PROTON BEAM TARGET STATION

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The following is a description of a setup for handling the front ends of secondary beams and the target and beam stop. The concepts will be illustrated by a model, which follows the general philosophy, but none of the mechanical or dimensional features should be taken too seriously as they are details to be worked out later.

The model consists of a rectangular box 3 ft  $\times$  3 ft and 80 ft long. It has vacuum flanges at both ends and is embedded in an 80 ft long, 16 ft  $\times$  16 ft heavy concrete sarcophagus, covered with an additional 25 ft of earth. Inside this hot box we have the targets, front-end collimators, septums and quads, etc., for the secondary beams. Typical component activation in this box is expected to be on the order of 1000 R/hr. All elements will sit on little flat-bed rail cars which ride above rails which double as an optical bench for survey purposes. Utilities would be run along the cars to the upstream end of the box. The main feature here is that the upstream end of the box and its environs will not become radioactive and normal "fixed installation" hot cell procedures can be used to maintain and/or modify the train assemblies. The design goal is to be able to remove a "front end" and install a different one in 2 shifts (16 hours). This is a time interval commensurate with an accelerator maintenance or studies period.

There are a number of problems which this model proposes to solve. One is the front-end survey problem. Front-end alignment can be done outside the hot box, and the front end will remain aligned after being inserted into the box. Furthermore, since the hot box is essentially a rigid beam, it will only suffer from slow systematic settlements. Since the front-end changes require only very modest load changes, the conundrum of conventional systems, where the shielding must be in place before the final alignment, is avoided.

The other unpleasant problem is the vacuum systems required for the target and beam lines. By enclosing the entire front end in vacuum, this problem is eliminated. A great deal of otherwise very complicated vacuum design is thus avoided.

Because the very hot elements can be removed from within the hadron shield, without removing the shield, it is possible to use earth shielding for the bulk of the shield. Apart from a considerable saving in the cost of the shield itself, it also eliminates the need for a very heavy crane to move the shielding or open it up for component replacement.